THE UNIVERSITY
OF MICHIGAN
SEP 1 196
ENGINEERING
LIBRARY

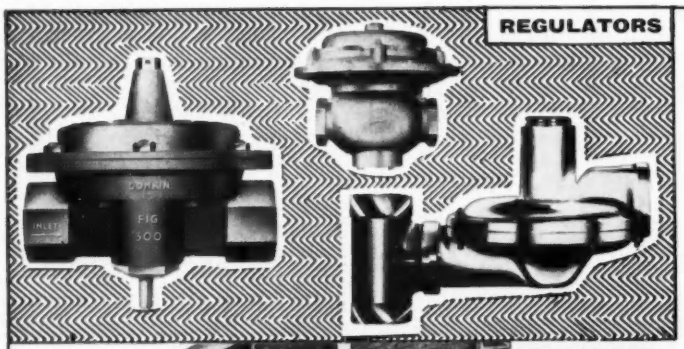
Gas Journal

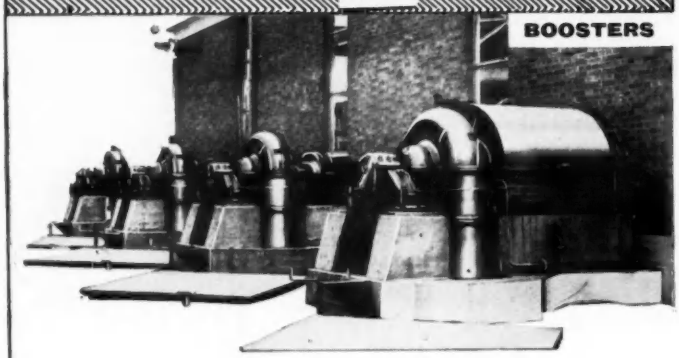
VOL. 307 113th YEAR LONDON, AUGUST 16, 1961 No. 5111 PRICE 1/6

there's more than tradition in a T.G. meter

THOMAS GLOVER & CO. LTD. *Main Offices and Works:* OLDHAM *Works and Branches at* LONDON MANCHESTER · BRISTOL · GLASGOW · CARDIFF · NEWCASTLE · BELFAST and DUBLIN

TG.50A

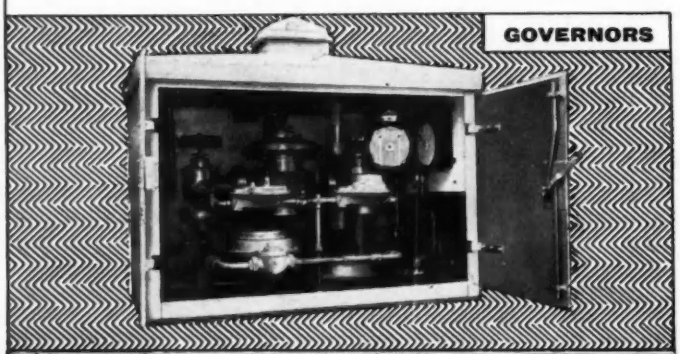


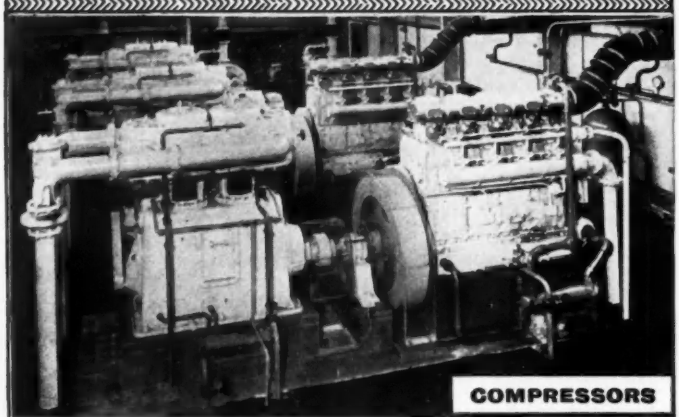


BRYAN DONKIN

VALVES

Equipment for Gas





- *Increased Pressure*
- *Regulated Pressure*
- *Regulated Volume*
- *Positive Shut Off*

ALL UNDER CONTROL WITH

BRYAN DONKIN

Sound Engineering Practice and Design together with First Class Workmanship ensure

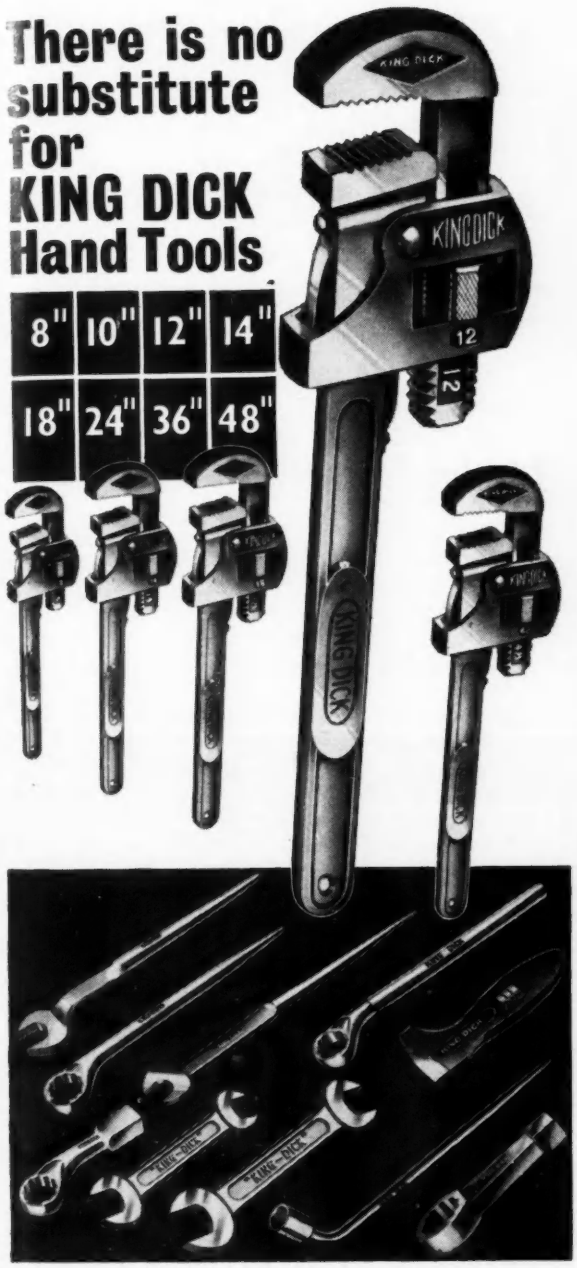
RELIABILITY

the

BRYAN DONKIN

Company Limited

CHESTERFIELD • LONDON • CANADA



King Dick have added a 12" model to their range of Stillson Wrenches. Together with the renowned King Dick quality of design and finish, it provides the finest and fullest range available. All parts interchangeable.

KING DICK Stillson Wrenches

BUY BRITISH

ABINGDON KING DICK LIMITED,

Abingdon Works, Kings Rd., Tyseley, Birmingham 11.

R252

Gas Journal

VOLUME 307 • NUMBER 5111 • 113th YEAR

WEDNESDAY, AUGUST 16, 1961

CONTENTS

EDITORIAL COMMENT

Lurgi, Methane—or Both? - - - - - - 187

SPECIAL ARTICLES

Lines of Communication—4: Getting Together. By W. H. Johnson - - - - - - - 189

The Petrochemical Industry in Common Market Countries - - - - - - - - 190

Thermoelectric Generator Drives Gas Furnace Blower. By J. Grindrod - - - - - - - 192

Five Mains Under the Yare - - - - - - 193

NEWS SUPPLEMENT

Four-Sites Probe for Vast Gas-from-Coal Plant - 196

Parliamentary Secretary Visits Bath - - - 196

The Government Wants 7-Month Wages Freeze - 196

Water Pollution: Laboratory Visit - - - - 196

Sales Agreement - - - - - - - - 196

Combustion Conference Plans - - - - 197

Powell Duffryn Report - - - - - - - 197

Personal Notes - - - - - - - - 197

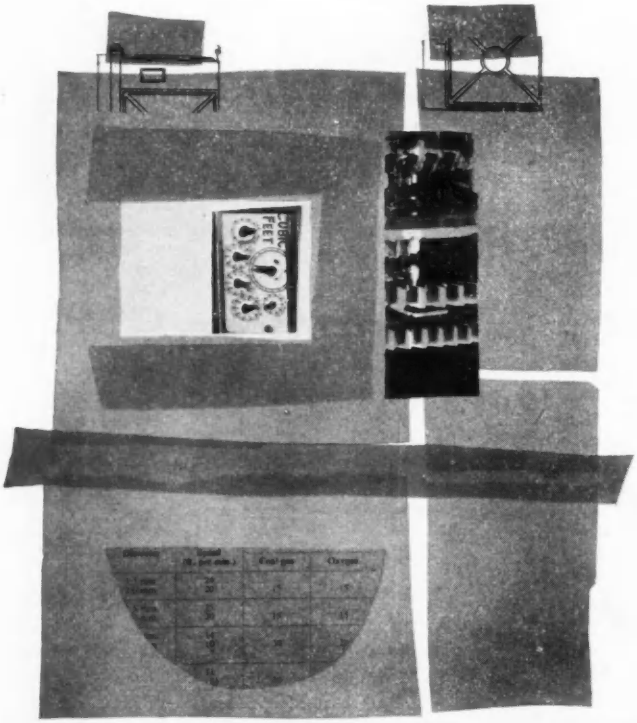
Obituary - - - - - - - - - 197

Editor:
GEOFFREY W. BATTISON

Assistant Editor:
WALTER F. TRUMAN

Technical Editor:
CHARLES J. P. DE WINTON
T.D., M.A., M.I.Gas E., M.Inst.F.

Publishers' Notice, See Page 353, May 31, 1961.



just to remind you . . .

Parkinson Cowan offer you the world's finest range of meters — all proved and renowned for their quality, reliability and accuracy

Domestic Range

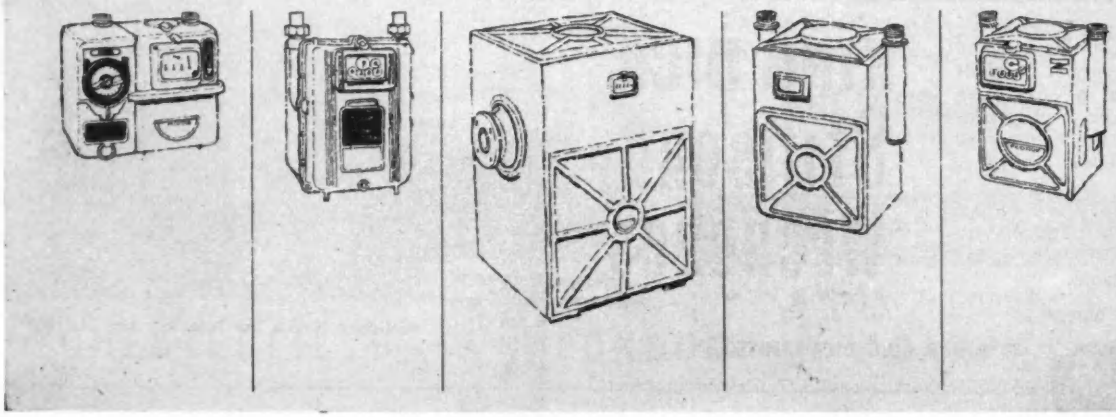
Tin plate D1, D1/200, D2, D4
Steel case ... ... Zephyr 218 and 219
Die cast aluminium case ... ... Flomaster

And remember — all prepayment versions of the domestic meters have the outstanding advantages provided by the Parkinson Cowan coin mechanism.

Industrial Range

Five capacities ranging from 700 cu. ft./h. to 9,000 cu. ft./h. cater for the widest range of industrial applications. And note these features; compact dimensions, self-lubrication, consistent accuracy, negligible maintenance.

Products of the Parkinson Cowan Group Terminal House · Grosvenor Gardens · London SW1



PCGM11

Gas Journal

COKE OVENS • BY-PRODUCTS • CHEMICALS

Lurgi, methane — or both?

ONCE again the question has been raised in Parliament as to whether there should be a national fuel policy. This time it was Mr. Albert Roberts, the Labour Member for Normanton—a mining constituency—who said that it was high time we had a fuel plan. He was initiating a debate on the power industries during the third reading of the Consolidated Fund Bill.

We think it may be taken fairly for granted that such questions are generally put by those interested in coal, and coal almost exclusively, but in this case Mr. Roberts went on to suggest that if a plan could be worked out for gas and electricity, the amount of oil consumed by these industries could be held as at present or possibly reduced.

Cheap fuel is clearly a basic need if industry in this country is to be prosperous, and we thought it was particularly interesting that Mr. Roberts should have suggested that this might be possible if gas *and electricity* —were produced from indigenous coal—gas in particular being made from inferior coal in Lurgi type plants.

On the face of it such a suggestion seems perfectly feasible, but there are a great many factors to be taken into account before gas made in large Lurgi installations can be judged as the cheapest possible gaseous therm.

Clearly the mining interests in this country are worried by the prospect that there might be large importations of liquefied natural gas into Britain from either North Africa or the United States, and will therefore do all in their power to prevent it on a really large scale.

As yet the gas industry cannot be certain which will be the cheaper, and this may well depend on the stability of coal prices. As far as we know, the only coal that the gas industry has contracted for at a fixed price over a reasonably long period is that for the Lurgi plant at Westfield in Fife. We understand, however, that there may be an agreement between the Gas Council and the French company developing the gasfields in the Sahara, for a fixed price for natural gas shipped from the Algerian port of Mostaganem, and it may well be for as long as 15 years. Knowing the importance of this particular item in the make-up of gas production costs, we would question the assumption that Lurgi gas is necessarily the cheapest gaseous therm, unless the most advantageous terms can be made with the National Coal Board for a period representing a substantial proportion of the life of the plant.

Speaking later in the debate, Mr. John George, Parliamentary Secretary to the Ministry of Power, emphasised that the future of the coal industry in this country depended on whether coal as a fuel could be made competitive with other fuels. On this, too, depended whether it could retain its position and whether it would be able to advance it.

We hear a good deal about the efficiency of our fuel industries, but even the most efficient and the best managed will not be competitive if the cost of their products is relatively too high.

Mr. George assured Mr. Roberts that in spite of the possibility of cuts in Government expenditure and the thorough overhaul of money being spent on the nationalised industries, there was no question of slowing up the development of mechanisation of the mines. Work would go on as planned. He did say, however, that a study group was in existence on which both the National Coal Board and the Gas Council were represented to look into the future of the Lurgi process to make certain that gas made from the present plant at Westfield and any future plants to be built in this country did in fact represent a cheaper therm.

Referring to the gas industry's tendency towards increased use of oil, Mr. George pointed out that this was not nearly so great as many people supposed. The drop in coal consumption by the industry last year was only about 100,000 tons, and in certain cases oil had its own place in gas production, where coal really could not replace it.

He was of course referring to peak load gas. The unsuitability of coal as such for this purpose has been realised for some 70 or 80 years, and it was almost certainly the unsatisfactory arrangement of keeping retorts standing, and perhaps holding a proportion of a works carbonising plant in 'suspended animation' during the

winter months, that led to the conception of the c.w.g. plant. With the high cost of coke any means by which this comparatively cheap form of peak load plant can be used more efficiently and at higher output is to be recommended.

The all-too-prevalent idea going round uninformed circles that the gas industry is a dying industry was, we think, effectively stamped on by Mr. George, who stressed that it quite clearly had an expanding future —in fact that it was expected to expand by some 25% in the next ten years. Under such hopeful conditions there would be room for coal at least at its present rate of consumption. There would be room for oil, too, he said, as well as other products needed in the production of the cheap fuel asked for by Mr. Roberts. But at present the gas industry was fighting for its life, and it should not be denied any allies which would enable it to produce a cheap therm and so be able to stop the falling away of its customers.

With all its might

There can be little doubt that the industry is indeed doing just that, and doing it with all its might. To say that it should use more coal or be made to do so by the laying down of a fuel policy weighted in favour of the coal industry is, we think, quite absurd. There can be little doubt that should it be forced to do so, it too would quickly become quite uncompetitive, even more so than the coal industry has become in the last few years.

In the past when coal was in short supply, and the gas industry was essentially dependent on coal as its only important raw material, it had to put up with what it was given, even though this might be unsuitable imported coal from America. In self-defence it evolved and developed oil gasification processes and so counteracted these adverse conditions. A return to the former dependence does not, we think, seem either very likely or very wise.

The points from this particular debate are clearly indicative of the attitude that the Government takes towards the future of the industry. It is reasonably clear, too, that it realises gas is able to supply a fuel both to industry and to the domestic market which will enable its consumers to become completely up-to-date in the type of plant they use or the appliance they decide to install.

Recognition of gas grows

That the advantages of using gas are being steadily recognised must be clear from the increase in gas consumption last year of between 2 and 3%. This includes a rise in the domestic load and has been described as the 'highest ever' consumption of gas in this country.

It is not unnatural when we see the immense advances made by those countries fortunate enough to possess resources of natural gas that the British industry should be making such an effort to free itself from its traditional ties with coal and carbonisation. Undoubtedly Lurgi gas has distinct possibilities for the production of relatively large volumes of gas at high pressure from works taking up far less space than a conventional gasworks. These large volumes need an all-embracing distribution system to make quite certain that the highest possible load factor can be maintained, as well as capacious, inexpensive storage from which to supply peak load gas.

We thus come back to the question of the possibilities and the probability of a national grid. And this in turn raises a question, which we ourselves have in fact posed some time ago, as to who will manage such a grid. With the autonomous position of the area boards, the only authority which could do this is the Gas Council or some authority appointed by it which would have 'supra' board standing. It might be asked whether individual boards would take very kindly to such an arrangement voluntarily, or whether it might be necessary to change the relationship between the Gas Council and the area boards by modifying the Gas Act of 1948.

It seems, however, that a national grid will become inevitable within the next ten years, resulting in a structure for the industry which would be far nearer that of the electrical industry.

What would be the likely results of the importing of liquefied natural gas, if permission to do so were to be obtained from the Minister? Lurgi gas is known to be a lean gas, and the Westfield plant enriches its product with butane from the refinery at Grangemouth. At one time it was proposed to use methane from the mines in the Fife coalfield, but it appears this was abandoned. Butane is relatively cheap, causing the somewhat dangerous situation of the enricher being almost cheaper than the gas it enriches.

More satisfactory enricher

Methane, however, is a more satisfactory enricher than either propane or butane since more can be added to the lean gas without influencing the final combustion characteristics of the town gas as distributed. At the same time methane is easily reformed.

For these reasons, it is not surprising that the Gas Council probably does not regard the importation of methane and the manufacture of gas by the Lurgi process as two distinct projects in the way that the coal industry seems to do. The Gas Council almost certainly regards the two projects as complementary, and is therefore determined to go ahead with both.

Looking back over the years since nationalisation, the very solid achievements in rationalisation which the gas industry has boldly accomplished are clear for all to see. The reduction in the number of gas-making stations from 1,050 to some 400 in itself shows the magnitude of the programme which the industry has just about completed. In doing this, it has become grid-minded in its future planning so that whatever changes are forced upon it in the next ten years or so, the foundations have been laid for the greater centralisation of gas production.

There can be little doubt that the very far-sighted proposal put forward by Dr. J. Burns in his Presidential Address to the Institution a few years ago, that gas manufacture should be concentrated in the Midlands, might well come to pass.

LINES OF COMMUNICATION—4

GETTING TOGETHER

By W. H. Johnson

ONE never finds out what people are really like until one catches them unawares when they are being themselves, without a party face on—just as one can never learn to be a gas engineer by attending meetings, however erudite the talk.

No amount of talk can prepare one for tackling an oxide fire, or a couple of miles of flooded main.

From that point of view meetings are bound to be a failure. Even if you happen to have put out an oxide fire the day before, talking about it is no sure help to the man who is going to have one tomorrow. A strong wind or a set of high level boxes may give him quite different problems.

Meetings have their uses, of course, and it would be a sad day if the practice of holding them was ever abandoned. The chance that they will ever be discontinued by decree is as remote as any other completely totalitarian gesture seems to be, but it is not impossible that they could die of suffocation.

Reasons for meetings

It depends if it is possible to recognise the reasons for which meetings are held at all, without axe-grinding reservations. The commonest answer to the appropriate question will be: 'To give people a chance to discuss mutual problems, and to share experiences'.

That, I submit, is an excuse, not a reason. The commonest topic is themselves or mutual friends. Just the same, let us accept it, if it will explain, for example, why I, as a junior, travelled about 50 miles to tour a rope factory.

A large party of us monopolised the staff of the place for a day, ate their food and then sat in their premises to hear a paper. Not a paper on 'Gas in the rope industry', but, I believe, on 'Dephenolisation of a gasworks effluent'.

It must have been no end of a treat for the rope people, and the rest of us, the guests, learned late in the paper that the problems described were unique to one works.

That day has stuck in my mind for one thing only. I discovered that in rope works one is always ankle deep in hemp fibre waste, and lasting though the impression has been, its educational value has been scarcely noticeable.

Let us be honest about it, an unquenchable thirst for knowledge is low among the reasons for fraternal gatherings. The top places are taken by human motives.

There is the sociological reason that, by escaping occasionally, with clean fingernails, we assert that we are not slaves to the job. Or, to pitch it in a lower key, it does you good to have a day away from the place.

Of course it does, and if you are of the rank and file you can say so. I like the people in the body of the hall best, for they are less inhibited, less prone to the discomforts of being ambitious.

We cannot afford to neglect the ambitious minority, however, for without them there would be no second—social—reason for meetings, and probably no meetings.

Those of us who are content to sit back do not always give sufficient credit to the officers who spend their spare time organising and planning on our behalf. Some people are born with an urge to that sort of thing, but not many. The career motive is much commoner, and as a deliberate act of policy may be recommended.

When the obituaries of some of today's leading figures in the industry are written, many will include such items as 'President of . . . Juniors, 19—; hon. sec. of . . . District Association from — to —'. That is the end and the justification.

How rarely one can read that 'X' was the author of some paper of startling originality, or indeed that, as president, he actually accomplished anything outstanding.

The day I attended my first Junior meeting as a young man I thought I was in the wrong place, for several of the Juniors were shrunken, bald or grey. I could not imagine the Seniors.

This anomaly was, I believe, raised officially a while ago, then forgotten after the comfortable discovery that it was merely an inadequacy of the language which led the titles to deceive.

Is it, though? Are we sure that there is not a little of the caste system, of snobbery, at work? All wisdom does not live in the top branches, and even the best men, after a few years at a desk, could do with a refreshing breeze from lower levels blowing across their bows.

It would not harm the lower orders, too, to find out by social contact that their seniors are not all as dull and misguided as is generally assumed.

But what of that abstract quality, content, without which a meeting remains in the admirable but inappropriate category of a day excursion to Blackpool? It should be recognisable, after every meeting, that it has contributed to the sum of knowledge in the participants, if only in a modest way.

Stating opinions

I have commented elsewhere that the presentation of a paper allows the speaker to state one or more cases or opinions, which somewhere in the subsequent discussion are denied, refuted, contradicted; the contradictions often being at variance with each other.

All the loose ends are left untied, no conclusion is reached: not even a majority vote. Anyone seeking enlightenment is baffled. And egotists are allowed to spill their torpid egos over the assembly, for the lack, usually, of a firm and incisive censorship from the chair.

There are several ways out of this morass, one being that adopted at the combustion engineers' annual congress, and no doubt in other places. More than one topic of current importance is chosen, and each is given to a study group of about six people, with its own chairman.

Each group thrashes out its topic inside a time limit, and subsequently puts its majority view to a full meeting at

Continued on page 194

The Petrochemical industry in Common Market countries

THE Kredietbank, of Belgium, recently reviewed the West European petrochemical industry.

Reminding that the petrochemical sector is the branch of the chemical industry, basic materials of which are oil products and natural gas, it pointed out that the bulk of its output consists of aliphatic compounds, but that it also manufactures aromatics—traditionally the province of the carbochemical sector—and inorganic compounds, such as ammonia.

The organic products result from the upgrading of hydrocarbons and may be subdivided according to the quantity of atoms they contain.

The advantage of petrochemicals lies precisely in the fact that these two elements—hydrogen and carbon—are present in proportions that make it, either more or less, easy—by various processes, including cracking, reforming and polymerisation—to form new compounds. Hence the creation of a multiplicity of entirely new products, such as plastics, detergents, and synthetic fibres.

'Fine chemicals'

But to these should be added a wide range of what are known as 'fine chemicals' which, although only produced in rather small quantities, are of great importance to several sectors of the chemical industry, such as pharmaceuticals and cosmetics. The number of different petrochemical compounds may be estimated, according to what is understood by the term 'different,' at 3,000 to 5,000, and there are no signs that the limit is being approached.

The ease with which the materials in question are able to be treated has also enabled petrochemicals, if not to supersede, at all events to offer a strong challenge to several established processes, notably production of acetylene from calcium carbide and ammonia from coke-oven gas.

Another advantage of petrochemicals is that their basic materials consist in large measure of waste—substances that are inevitably superfluous and unable to be used for other purposes—produced in the course of oil refining. It is true that this proportion is tending to diminish, as attention is now being turned to natural gas and also to other petroleum fractions. If, then, the basic materials are able to be obtained fairly cheaply, the investments required are all the heavier. Furthermore, the optimum output can only be achieved in large vertically and horizontally integrated concerns able to consume the whole of the raw material.

Considerable outlets

In order to pay their way such enterprises must have considerable outlets. This is the case in the U.S.A., *e.g.*, where petrochemicals have thus registered a tremendous expansion. This has naturally been assisted by the fact that oil is produced in the country itself, although it is also a fact that, while the petrochemical industry turns out 30% of the total U.S. chemical production—and as much as 70% in the organic compounds sector—it only accounts for around 2% of the national oil consumption.

However, the extent to which the petrochemical industry has flourished in the U.S.A. must not be allowed to overshadow completely the fact that in Europe, too, it has made appreciable progress—and in far less favourable conditions. Between 1953 and 1958, Europe's output of petrochemical products quintupled; the E.E.C., together with Britain, made by far the largest contribution to this expansion. In France, petrochemicals already represent 25% of the production of the entire chemical industry, and around half that of the organic sector. In Germany, the corresponding proportion for organic chemicals is 40%. Production of petrochemicals in the Common Market countries in 1959 (estimates) as compared to 1953 are as shown in Table 1.

TABLE I

Country	Tons carbon content	
	1953	1959
Germany	55,000	335,000
France	16,000	280,000
Italy	12,000	180,000
Holland	12,000	67,000

TABLE II

Country	Investment, mill. $	
	1954	1958
Germany	3	263
France	13	84
Italy	—	123
Holland	—	23
B.L.E.U.	—	17

The 1958 figures are the total investments at the end of year.

Germany.—The abundance of coal deposits in Germany and the marked expansion recorded by its steel industry and its allied coking plants, have given rise to a vast carbochemical industry. Even so, petrochemicals have also come rapidly to the front.

The three successors to I.G. Farben, which dominate the entire German chemical industry, have participated in this advance with their plastics and synthetic fibres, Badische Anilin und Soda-Fabrik, whose mass production amounts to 40% of petrochemicals, and Farbwerke Höchst have their own cracking plants. As regards raw material supplies, B.A.S.F. works in close co-operation with Deutsche Shell, and there is a similar arrangement between Farbenfabriken Bayer and B.P. A fourth major petrochemical concern—one of the largest in Western Europe—is the Chemische Werke Hüls-Bunawerke Hüls group,

which heads the list of synthetic rubber producers in the E.E.C., and also manufactures various plastics, detergents, glycol and alcohol. This group's raw materials are supplied by Esso.

Among the less important firms in this sector are: Bergwerksgesellschaft Hibernia and its subsidiaries (ethylene, polyethylene, ethanol, nitrogen fertilisers, cumene and propylene), Wacherchemie (ethylene derivatives), Rheinpreussen AG für Bergbau und Chemie (detergents and solvents), Ruhrchemie (polyethylene), Röhm & Hass, Reichhold Chemie, Deutsche Erdöl and Carbosulf Chemische Werke.

France.—While Germany holds first place in the field of petrochemicals, the fastest progress in recent years has indisputably been achieved by France. This movement has been stimulated by the discovery of natural gas deposits in the area around Lacq. Practically all the leading chemical and oil enterprises in the country, as well as several other sectors and foreign groups, have acquired interests in the petrochemical industry. Some firms have set up production plants for their own use (14 in all), but in most cases (over 30) a joint venture has been formed, in which the large groups have associated either together or with smaller enterprises. Because of the great variety of products and the absence of production figures for many firms, it is scarcely possible to make a comparison between the various companies.

Four companies

At the top of the ladder are four companies which have their own production plant, *viz.*, Ets. Kuhlmann (ammonia, ethylene and propylene oxide, polyethylene, additives for lubricants, methanol, urea, plasticisers, detergents and, where produced, derivates, both of the products of the company itself and those of its leading subsidiaries); Péchiney (perchlorethylene, ammonia, PVC, polyethylene and ethylene, acetylene and propylene and their derivatives); Rhône Poulenc (phenol, polyethylene, acetylene derivatives, urea, synthetic fibres); and Ugine (latex, rubber, acetone, methyl-ethyl-ketone, ammonia, PVC, cumene, perchlorethylene). Also important—although they have no production of their own—are Air Liquid (polyethylene, polypropylene, ammonia, urea); Progil (basic materials for solvents, PVC cumene, phenol, acetone, paraxylene); and Saint-Gobain (acetylene, propylene and butylene and their derivatives, PVC, ammonia, detergents, and synthetic rubber).

Main interests

The oil refineries also rank among the principal petrochemical enterprises. Their main interests are in the raw materials, part of which they sell to their subsidiaries. Through the latter, too, they are concerned in the manufacture of the finished products. In this connection, mention may be made of Socantar (aromatic compounds), Cie. Française de Raffinage (polyethylene, rubber), Esso Standard (rubber, additives for lubricants), Pétroles BP, Royal Dutch-Shell and Soc. Nat. des Pétroles d'Aquitaine (natural gas extraction at Lacq); the first three of these enterprises possess their own production plant.

Of less importance are Celtex (synthetic fibres); Nobel Bozel (sulphur); Melle (acetylene derivatives); Huiles, Goudrons et Dérivés (polyethylene, polypropylene), and also those enterprises the main activity of which is the manufacture of nitrogen fertilisers, *i.e.*, Pierrefitte, Office National Industriel de l'Azote and Potasse et Engrais Chimiques.

The foreign companies' output consists for the most part of carbon black. This is the case with Cabot Texas Butadiene, United Carbon, Philips Petroleum, and Continental Carbon. Other foreign companies with interests in the petrochemical sector are California Spray Chemical (fungicides) and Oronite Chemical (solvents and detergents).

Italy.—The Italian petrochemical industry, chief basic raw material of which is natural gas, is marked by a high degree of concentration. There are two main groups. The first, Montecatini, accounts for nearly half the national production of plastics materials and around 60% of that of synthetic fibres. In these fields, the activity of Montecatini and its subsidiaries covers virtually the entire range. The company also manufactures ammonia and synthetic rubber. It is always in the van of technological progress, having developed its own processes for urea and high-pressure polyethylene, and been one of the first enterprises to produce polypropylene resins. Its future expansion will also be in the petrochemical sphere, since it plans to establish a plant for the production of colours and kindred products (at Cadogno) and two large multiproduction units (at Bussi and Brindisi respectively). The Cadogno and Bussi plants will use natural gas as their basic material.

The second main group is Azienda Nazionale Idrogenazione Combustibili (ANIC), a subsidiary of the State holding company Ente Nazionale Idrocarburi (ENI). Montecatini has a minority participation in this concern, the main basic material of which is natural gas, and its production is geared to that of nitrogen fertilisers and synthetic rubber. Some subsidiaries also produce vinyl chloride in co-operation with Wacherchemie (Germany) and carbon black in co-operation with Philips Petroleum. At Gela, Sicily, an extensive plant for the production of ethylene, propylene, ammonia and their derivatives is at present being built.

The Edison group has also turned its attention to this branch of the chemical industry, in which it has undertaken two joint ventures: One with Monsanto (detergents plastics materials), and the other with Union Carbide (ethylene derivatives).

Vast refinery

Finally, mention should be made of the Bombini Parodi Delfino group's enterprises, Columbian Carbon-Continental Carbon (Carbon black) and Societá A.B.C.D. (polyethylene).

Holland.—Royal Dutch-Shell, one of the most important petrochemical enterprises in the world, naturally has a leading place in its own country. It has one of the largest refineries in the world at Pernis. Together with its subsidiaries, it manufactures PVC, acetone, glycerine, detergents, synthetic resins, synthetic rubber and other products.

The Dutch petrochemical industry seems to be mainly in the hands of non-chemical enterprises. Staatsmijnen (State Mines), has its own cracking plant and has acquired a certain importance as a producer of polyethylene, nitrogen fertilisers and phenol, the last named product being manufactured in association with the U.S. company Dow Chemical, the Dutch subsidiary of which is to start production of synthetic rubber in the course of this year.

Other important petrochemical enterprises are AKU-Goodrich (synthetic rubber), Koninklijke Nederlandse Hoogovens and Cie. Néerlandaise de l'Azote (nitrogen fertilisers), Koninklijke Nederlandse Zwavelzuurfabriek v/h. Ketjen, G. L. Cabot and Continental Carbon-Columbian Carbon (carbon black) and Cinder and Neville Chemical Co. (synthetic resins).

Belgium.—In Belgium, the petrochemical industry is largely controlled by Petrochim, a company whose shares are held by a small number of leading Belgian enterprises.

Its production range includes phenol, acetone, ethylene oxide, dodecyl benzene, propylene, and several of their derivatives. Together with the U.S. company Union Carbide, a new enterprise, Cobenam, was incorporated for the production of polyethylene, which will start in the course of this year.

Petrofina, one of the principal shareholders of Petrochim, has associated itself with the U.S. company Amoca Chemicals Corporation in the creation of a subsidiary whose activities will consist of manufacturing additives for lubricants.

The only other firms of any note in this sector are Carbochimique and Union Chimique Belge, which produce nitrogen fertilisers by petrochemical processes.

In drawing its conclusions, the Kredietbank states that in the field of petrochemicals E.E.C. is lagging considerably behind the U.S.A. It is, moreover, a branch offering remarkable possibilities, so that even in the U.S.A. a further appreciable expansion is likely. It must, therefore, be concluded that as regards the Common Market the petrochemical sector is one with outstanding growth prospects, especially as its development cannot but be accelerated by the abolition of the existing restrictions on international trade.

At enterprise level, however, account must be taken of the fact that industries with a bright future always attract 'outsiders.'

Another important point is that the two industries directly concerned, *i.e.*, oil and chemicals, primary interest of which is in the basic raw materials and the finished products respectively, show a tendency towards vertical integration which is leading them to operate in the same sphere.

In the U.S.A., the result has been an excess of capacity and keen competition for a number of products. In Europe, it has not yet come to such a pass, but it is the direction into which all signs are pointing. The best placed enterprises, therefore, are those that are able to keep pace with the development of new products. The most advantageous basis is a certain tradition in the sector, a sufficiently varied range of production, ample financial resources and an extensive research division.

Thermoelectric generator drives gas furnace blower

By J. Grindrod.

Engineers of the C. A. Olsen Manufacturing Company, which is a subsidiary of Westinghouse Electric Corporation, have been working on this new furnace for more than two years, and the project has now reached its final stage.

The objective is to produce a central heating, forced-air furnace with its own source of power using a commercially available blower.

CLAIMED to provide a gas-fired central heating system, the forced-air furnace blower of which operates quite independently of any external source of electric power supply, a new plant with its own built-in thermoelectric generator is under development by the C. A. Olsen Manufacturing Company at Elyria, in the United States.

Rated at 130W, the thermoelectric generator converts the heat of the burning gas directly into electricity, producing sufficient power to drive the full-size furnace blower.

When the furnace is started, power from the generator builds up gradually, initially placing the blower in operation at a slow speed and slowly increasing it. As a result, air delivery to the floor registers increases gradually, both in velocity and temperature, until the maximum operation of the furnace is attained.

During recent tests on an experimental unit, the generator produced 130W at approximately 9V. The heating capacity of the unit was 80,000 B.t.u., the largest ever achieved by this type of furnace.

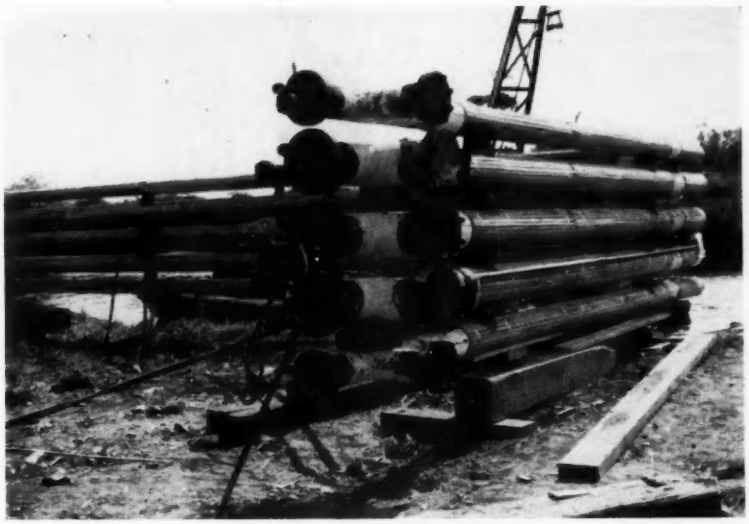
The thermoelectric generator itself consists of four trays or 'modules,' 8¼ in. high by 4¼ in. wide and 2½ in. deep, each containing 47 thermoelectric couples. Spaced at intervals, these modules were installed in openings in the shell of the combustion chamber.

Under this arrangement, the 'hot' side of the module becomes an integral part of the combustion chamber. Fins on the opposite side of the module are cooled by the same air that is heated by the furnace and moved through the ducts into the rooms of the building.

The basic component of the thermoelectric generator is the thermoelectric couple, which consists of a junction of two dissimilar semiconductor-type materials. If one side of the couple is heated, raising its temperature above that of the other side, an electric current is created at the junction.

The new Olsen gas furnace under test at Elyria, U.S.A. The 130W. thermoelectric generator is positioned around the combustion chamber. In the photo, one of the four-finned modules is being installed. The blower and motor, which are powered by the generator, are visible at the base of the furnace.

Five mains under the Yare



A view of one of the vertical sections and part of the horizontal section of the assembly of five gas mains before they were launched into the River Yare at Norwich.

THE Eastern Gas Board recently completed the unusual job of laying five steel mains under the River Yare at Norwich. Three of the mains were of 8-in. diameter and the other two were of 6-in. diameter.

One of the 8-in. mains is part of the high pressure integration main between Norwich and Lowestoft, the connection between Norwich and the South Norfolk grid system; the second is a duplicate, and the third may be used for methane.

One of the 6-in. mains has been provided to take effluent from the Board's proposed new works on the northern side of the river on the Cremorne Lane site, at present a holder station, to the sewage works situated about three-quarters of a mile away south of the river.

The second 6-in. main is provided for the possibility of taking sewer gas from the sewage works to the proposed gasworks.

The horizontal length of the mains is 136 ft. The southern vertical upright section is 19 ft. 6 in., and the northern upright section is 2 ft. longer, the difference being to provide a fall to the northern side where syphons can more easily be pumped on the site of the new works.

The width of the river at the point of crossing is 126 ft., but coffer dams were built on each bank to receive the vertical sections. As the river authorities specified a minimum cover of 5 ft., the trench in the bed of the river had to be a minimum of 6 ft. deep in the middle of the river and up to 20 ft. deep at the sides.

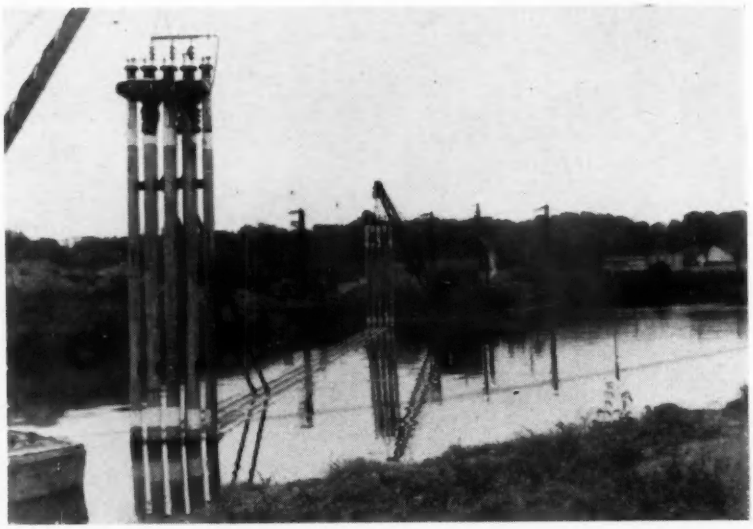
The five mains assembled together weighed about ten tons. The Board's distribution staff fabricated them on the northern bank, welding them together with spacers of 6-in. steel pipe at 11-ft. intervals.

Apart from internal red lead coating and external bitumen and woven glass wrapping, protective measures taken were the provision of magnesium anodes for cathodic protection against erosion, and cladding with elm laths to protect the bitumen wrapping against mechanical damage.

Work on the day of the launch, June 6, began as early as 6 a.m., when the whalings were removed from inside the coffer dam and work began on removing the sheet piling at the front of them.

A further precaution was the provision of wooden bolsters or 'stocks' above and below the mains at the points of entry into the coffer dams to prevent any cutting action from the piling.

The mains being launched down the slipways.



The mains floating, with the assistance of the cranes, on the river before being positioned in the coffer dams and sunk.

Dredging was almost a continuous process until within almost an hour of sinking the pipes into position, as the river bed was of gravel/shingle mixture and tended to slide into the dredged trench from either side, particularly when disturbed by passing river traffic.

The structure of mains was launched down greased slipways by means of four pulley blocks and entered the water at 2 p.m. In spite of the weight of the pipes, the air in them provided sufficient buoyancy to require only one ton lift by the floating cranes to keep the horizontal section just showing above the water.

At 8.30 p.m., when the trench was considered to be sufficiently dredged, the structure was positioned by the floating cranes, which first took it across the river at an angle of about 45 degrees for the northern end to be manœuvred into its coffer dam first.

When in position, the mains were sunk into the trench by pumping water into two of the 8-in. mains.

There was much relief when the mains bedded home firmly, and the day's work was concluded at 10.30, after the diver had finally walked the length of the crossing to check that all was in order. Final covering and filling in was carried out the next day.

The work was supervised by Mr. E. Williams, Norwich Divisional Engineer, and Mr. J. V. Knight, Divisional Mains Engineer, and his staff. Mr. B. Wilkinson, Area Distribution Engineer, was on site all day, and Mr. J. T. Brookes, Norwich Divisional Manager, also watched the operation.

Contractors for the piling, dredging, launching and sinking were May, Gurney and Co. Ltd., of Trowse, Norwich.

This was the Board's second river crossing this year. The first, in February, was the crossing of the River Waveney at Beccles by two 8-in. steel mains.

The horizontal section was 92 ft. long and the vertical sections 19 ft. May, Gurney and Co. Ltd. were also contractors for the Waveney crossing.

GETTING TOGETHER

Continued from page 189

which other speakers may attempt to modify that view. The famous guillotine is applied at the full meeting, and in the end a firm conclusion is drawn upon each matter on the agenda.

It is democratic yet decisive, and gives a feeling of time well spent.

No one is likely to deny that there is subject matter galore for discussion, and I should like to see the lower ranks giving their views on broad issues. Never mind, for the moment, whether we prefer to patch siliceous material at high or low temperature. Let us see who believes in a policy of increasing dependence upon imported fuel.

There could be some surprises in store, as on that other occasion when the Oxford University Debating Society decided that 'under no circumstances will this House fight for King and country.'

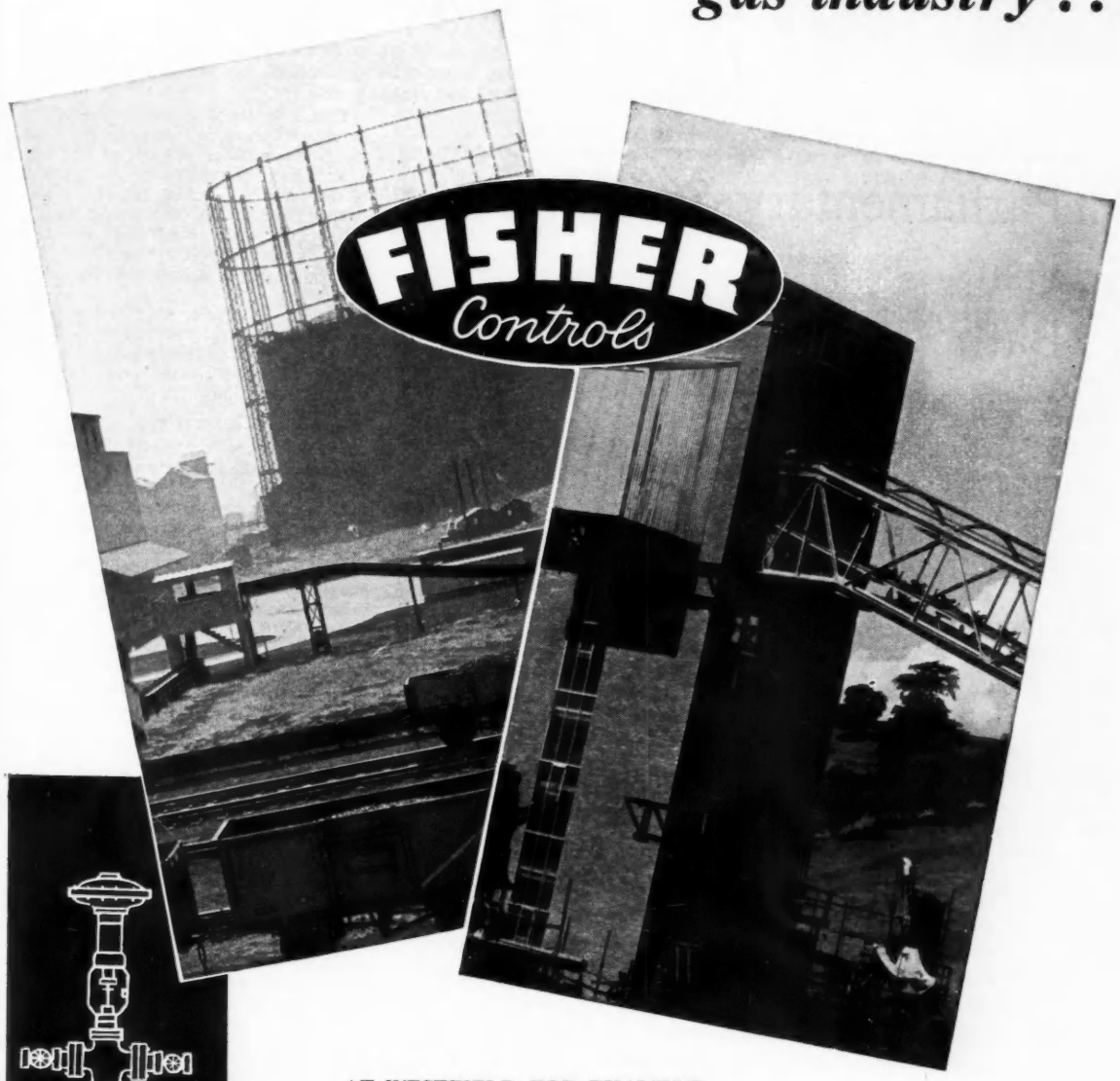
Besides, it would be a useful antidote for the creeping paralysis of the 'big firm' outlook, which we are coming to share with the civil service.

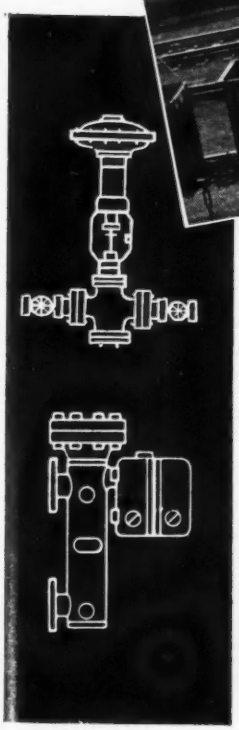
No one expects every majority decision to be a correct one, however thoroughly argued, but at least it represents a climax to a symposium of applied thought. Meetings which are run in traditional fashion, with lengthening pauses waiting for the last reluctant speakers from the hall, have their peak in the wrong place. The vote of thanks is a happy release from a fidgeting decline of interest.

The educative factor is professedly well to the fore in the articles of our associations. What better could they do for their members than give everyone a chance—a real chance—to express himself clearly and briefly on a variety of topics?

Let us, in fact, bring the spirit more into line with the letter. Let us dispense with the system of stars and supporting cast, and bring in the full team game.

In the 'changing face' of the gas industry . . .





AT WESTFIELD FOR EXAMPLE . . .

Fisher control equipment has been specified to play a vital part in the processing of gas produced by the Lurgi gasifier. Control valves for this all-important phase of the Westfield operation are *extensively by Fisher.*

In this day of revolutionary new trends in gas production, Fisher is more than ever the name that means *control!*

FISHER GOVERNOR COMPANY LIMITED

Airport Works, ROCHESTER, Kent · *Telephone: Chatham 4-4400 · Telex: 89118*

EA A MEMBER OF THE ELLIOTT-AUTOMATION GROUP

FC9

NEWS SUPPLEMENT

JOINT STUDY GROUP MOVE

Four-sites probe for vast gas-from-coal plant

FOUR East Midlands sites are being investigated to see if they are suitable for a vast gas-from-coal plant needing a million tons of coal a year, says *Coal News*, newspaper of Britain's mining industry.

This is the latest important stage of an inquiry which a joint study group from the National Coal Board and the Gas Council are making into the development of the Lurgi gas-making process.

They have already considered a scheme for a plant which could make 109 mill. cu.ft. of gas a day—far bigger than any other gasworks in Britain, says the newspaper.

It would be three or four times the size of the Lurgi plant recently opened by the Queen at Westfield, Scotland, and a second plant which is being built at Coleshill, West Midlands.

Cheapest way

The NCB are convinced that this is the best and the cheapest way of making gas in Britain.

Three contractors will be asked to prepare designs, giving costs and layouts, of plants at three sites.

Sites near the following collieries are being considered: Desford, Leicestershire; Newstead, Nottinghamshire; Moor Green, Notts; and Langwith, Derbyshire.

Initial approaches have been made to local authorities concerning planning permission and essential services.

Contractors' reports should be ready before the end of this year, says the article, when the study group can consider which is the most suitable scheme.

Parliamentary Secretary visits Bath

The Parliamentary Secretary to the Ministry of Power (Mr. J. C. George), third from right, visited Bath recently. With him in this group, taken at the South Western Gas Board's Bath works are: Mr. A. C. Rea (Works Engineer and Manager), Mr. D. E. Vant (Mr. George's private secretary), Mr. H. Deadman (Head of Branch in the Ministry's Gas Division), Mr. G. F. Oliver (the Board's Chief Technical Officer), the Chairman of the Board (Mr. C. H. Chester), and Mr. T. W. Clapham (Area Production Engineer).

THE GOVERNMENT WANTS 7-MONTH WAGES FREEZE

THE Chancellor of the Exchequer has made it clear at a meeting with union leaders that the Government wants a complete freeze of nearly all wages and salaries in Britain for at least seven months.

The Government has also taken the unprecedented step of stating that it will decide the operative date of any awards for its workers made by the Civil Service Arbitration Tribunal or the Industrial Court, says the Labour Correspondent of *the Financial Times.*

The Government intends to review the economic situation early next year—in late February or early March—and will then decide whether the 'pause' can end.

It is obviously Mr. Lloyd's intention that this 'object lesson' should be noted and acted upon not only by the nationalised industries—which in theory are autonomous and cannot therefore be 'directed' by the Government—but also by employers in the private sector and by the Industrial Court and other arbitration bodies, says the correspondent.

There will certainly be informal contact between the Chancellor and these 'outside' groups during the next few weeks, if indeed it has not already taken place.

Water pollution: Laboratory visit

THE Water Pollution Research Laboratory will be holding open days on Wednesday and Thursday, October 11 and 12, 1961. The laboratory will show its work on development of methods of treatment of sewage and industrial wastes, and on other aspects of pollution.

Applications for invitations to visit the laboratory on these days should be sent to the Director, Water Pollution Research Laboratory, Elder Way, Stevenage, Hertfordshire.

Sales agreement

FURTHER to the news item 'Parkinson Cowan sign sales agreement,' which was published in 'GAS JOURNAL' on August 2, 1961, it is pointed out that as a result of this sales agreement with the American Meter Company Incorporated, Philadelphia, U.S.A., Parkinson Cowan Gas Meters are now marketing in Great Britain the American Company's volume and pressure gauges and base pressure and volume indexes.

COMBUSTION CONFERENCE PLANS

THE Combustion Engineering Association announces that a one-day conference has been arranged to take place on Thursday, October 19, 1961, at the Northern Exhibition of Fuel and Power for Industry at the Queens Hall, Leeds, at 10.15 a.m.

The opening address will be given by the chairman of the conference, Mr. N. A. McNeill, Engineer-in-Chief, Unilever Ltd., President of the Combustion Engineering Association.

At the morning session the subject will be 'Grit and dust from small boiler plants.'

A paper on 'The measurement of air pollution and the equipment for prevention' will be presented by Dr. R. Jackson, Superintendent, Physics Department, British Coal Utilisation Research Association, and a paper on the cost of installation and maintenance of equipment will be presented by Mr. H. Westwood, of the Dust Handling and Electrical Division, James Howden & Co. Ltd. An open discussion will follow these papers.

In the afternoon a paper will be presented by Mr. G. Gill, Group Manager of the National Industrial Fuel Efficiency Service for the Northern half of the United Kingdom.

Detailed surveys

The National Industrial Fuel Efficiency Service has recently completed seven years of work for industrial and commercial users of fuel. During that time detailed surveys, aimed at improving the efficiency of fuel-using plant, have been carried out in over 5,000 factories and premises. In the course of this work efficiency tests have been conducted on nearly 3,000 boilers.

These factory surveys indicate that substantial savings can be made—of the order of 15-20% of the fuel used on average—frequently, also, better utilisation of heat and steam leads to improvements in the factory processes and increased output.

Vast scope

The National Industrial Fuel Efficiency Service work indicates that, in fuel utilisation, there is still a vast scope for improvement, and in their Seventh Progress Survey several interesting recent developments will be examined.

The scope for waste heat recovery and examples of the methods adopted in several industries have been analysed and will be reported on during Mr. Gill's talk.

The Combustion Engineering Association has also arranged a working display of coal and ash handling equipment, to be held at British Railways goods yard, Salford, on September 19, 20 and 21.

Admission is free, and tickets can be obtained from the Association at 70, Jermyn Street, London, S.W.1.

POWELL DUFFRYN REPORT

THE Directors of Powell Duffryn Ltd. announce that the annual general meeting will be held on September 20, 1961.

Consolidated profits, including income from investments and interest receivable for the year ended March 31, 1961, after deducting Interest and Debenture Stocks, amount to £2,563,854 (previous year £2,156,500). Depreciation charged before arriving at the above figure was £1,261,005 (£1,076,332).

Of the increase of £407,354 in Consolidated profits before taxation, approximately £245,000 is attributable to newly-acquired subsidiary companies.

The directors had intended to recommend an increase in the Final Dividend from 10% to 12%, making the total for the year 18% as compared with 16%.

After careful consideration of the recent statement by the Chancellor of the Exchequer they have, however, reached the conclusion that they should not now proceed with their intention.

They are, therefore, recommending an unchanged dividend as follows: Final dividend of 10% actual, less income tax at 7s. 9d. in the £, on the 9,660,471 Ordinary shares of 10s. each in respect of the year ended March 31, 1961 (making with the Interim dividend of 6% actual paid on February 28, 1961, 16% for the year).

PERSONAL NOTES

MR. R. PALMER has been appointed General Manager of the Spun Pipes and Foundries Department at the Devonshire Works of the Staveley Iron & Chemical Co., Ltd. He had been general manager for some time of the foundry department. The Assistant General Manager is MR. R. WILKINSON, who will also continue to hold his post as Manager of the Spun Pipes Plant. The company has also appointed as Foundries Manager MR. W. D. HARRISON, who has been on their staff for a number of years.

MR. G. ESSAME, O.B.E., at present the Staff Director of the West Midlands Divisional Board, has been appointed Principal of the National Coal Board's Staff College at Chalfont St. Giles in succession to MR. N. G. FISHER, whose resignation was announced some time ago.

MISS HELEN SAUL, of Scawthorpe, Yorks., has been appointed East Midlands Gas Board demonstrator at the Doncaster showrooms. Miss Saul recently completed a demonstrator's course at Sheffield College of Technology.

MR. G. EGAR, local superintendent for the East Midlands Gas Board Lincolnshire division at Mablethorpe, has been appointed by the Board as Group Sales and Service Officer for the Spalding and Stamford district.

MR. R. H. STEWART, who recently resigned his directorships with Powell Duffryn Ltd., has joined Thomas Potterton Ltd., as Special Projects Manager, personally responsible to MR. E. G. BROOKS, the Managing Director.

MR. G. C. S. GREENHEAD, who joined Parkinson Cowan Ltd. two years ago as general manager (administration) has now been appointed to the Board of Directors. In his new capacity, Mr. Greenhead will be closely concerned with the Company's commercial development and general administration.

The recent retirement of MR. E. L. FARQUHAR, M.I.GAS.E., from the Production Staff of the North Eastern Gas Board, Wakefield Group, after 41 years' service brought to a close a family connection of over 165 years with the gas industry. Mr. Farquhar's father served with the Edinburgh Corporation Gas Department on the administration side, for over 45 years; while his brothers, Lawrence and Arthur, were gas engineers to corporation undertakings in Scotland. The family tradition, to the third generation, was continued by grand-daughter, Joan, a Senior Home Service Adviser, until her marriage. Mr. Farquhar has been a member of the Institution for 25 years and, for a period, was Chairman of the Commercial Section of the North British Association of Gas Managers. A past President of the Scottish Juniors, he was elected an Honorary Member, in recognition of his services over many years. Once South of the Border, Mr. Farquhar became an ardent supporter of the Yorkshire Juniors.

OBITUARY

MR. W. F. WHITE, who at the time of his retirement was manager of the Wellingborough showroom of the East Midlands Gas Board and who spent over 50 years in the gas industry, has died at the age of 67.

The Deputy Divisional Accountant for Leics. and Northants, East Midlands Gas Board, MR. W. ANDREWS, died on August 4, while on a touring holiday in the South of England.

J. BROWN & CO. LTD

SAVILE TOWN, DEWSBURY, YORKS.

Supply:—

"BROWNOX-de-LUXE"

PURIFYING MATERIAL

Purchase:—

SPENT OXIDE

WYNDHAM HAMMOND LTD.

DECORA WORKS • WOLVERHAMPTON ST. • DUDLEY • WORCS.

Tel: DUDLEY 54551-2-3

SPECIALISTS IN:

1. Design and Fabrication of all types of Light Steel Structures
2. Stripping and Re-sheeting and Glazing of Roofs
3. Structural Steel Painting
4. Insulation of Buildings

IN FACT

5. We can prepare Drawings and Schemes for New Development. Design, *Fabricate* the Steel, Sheet, Glaze and Paint. The whole of the project being carried out under *one* organisation.

INSTEAD OF FOUR OR FIVE CONTRACTORS— WE CARRY OUT THE WHOLE SCHEME!!

APPOINTMENTS VACANT

SCOTTISH GAS BOARD

ASSISTANT DOMESTIC APPLIANCE SALES MANAGER

DUE to continued expansion in the Scottish Gas Industry, we wish to appoint Assistant Domestic Appliance Sales Managers in the three Divisions of the Board based on Edinburgh, Glasgow and Perth. They will be responsible to Domestic Appliance Sales Managers for the development of appliance sales to domestic users through teams of Supervisors and Salesmen.

We are looking for men who are at present either Assistant Sales Managers or Senior Supervisors who are ready to accept further responsibility and are confident that they can apply up-to-date marketing techniques to develop sales. Previous experience of selling domestic gas appliances will be an advantage, but consideration will be given to all applicants with a proved record of success in selling to householders.

We offer a starting salary in the range of £1,365/£1,525 per annum depending upon qualifications and experience. A Contributory Pension Scheme is in operation. A car is provided for business use or alternatively a general mileage allowance is given where the applicant owns his own car.

We will pay particular attention to applicants aged 27/40, with a good educational background (a Degree would be an advantage), and administrative ability.

Please reply in confidence within ten days of the appearance of this advertisement, giving *brief* details of age, education, past experience, together with the names of two referees, to:—

A. T. FORD,
Secretary.

26, Drumsheugh Gardens,
EDINBURGH, 3.

SCOTTISH GAS BOARD
GLASGOW AND WESTERN DIVISION

TECHNICAL ASSISTANT (DISTRIBUTION)

APPLICATIONS are invited for a Technical Assistant (Distribution) based at Kilmarnock. The successful applicant will be in charge of a small technical office and should have the sense of responsibility and ability to control staff. The work will entail the carrying out of design and installation work on new mains, governor stations and telemetering installations throughout the Division, but particularly in the Ayrshire area. Consideration will be given to applicants who have a sound mechanical knowledge with particular reference to all types of pipe work and who are educated to Higher National Certificate standard or equivalent qualifications. Training will be given to applicants without present knowledge of the gas industry and an experience of contract work would be an advantage.

The post, which is pensionable, will be remunerated within Grade APT 7/8 (£770-£930 per annum) with placing according to qualifications and experience, and the successful applicant will be required to pass a Medical Examination.

Applications, marked TA/D, stating age and giving full particulars of education, training, qualifications, and experience should be addressed to the Divisional Personnel, Welfare and Training Officer Dept. G.J. The Scottish Gas Board, 9, George Square, Glasgow, C.2, to reach him not later than August 30, 1961.

SCOTTISH GAS BOARD
GLASGOW AND WESTERN DIVISION

DUMBARTON/HELENSBURGH DISTRICT
TECHNICAL ASSISTANT

APPLICATIONS are invited for the post of Technical Assistant at Dumbarton Gas Works, Glasgow and Western Division.

Applicants must be experienced in the operation of Continuous Vertical Retorts and should possess a Higher National Certificate in Gas, Mechanical or Chemical Engineering.

The post, which is pensionable, will be remunerated within Grade APT.7, Provincial A, £770-£870 per annum, with placing therein according to experience and the successful applicant will require to pass a medical examination.

A house is available for rental.

Facilities for Further Study are available under the Board's Education and Training Scheme.

Applications marked TA/DH stating age and giving particulars of education, training, qualifications and experience, should be addressed to the Divisional Personnel, Welfare and Training Officer, Dept. G.J., The Scottish Gas Board, 9, George Square, Glasgow C.2. not later than August 30, 1961.

EAST MIDLANDS GAS BOARD
LEICESTER AND NORTHANTS DIVISION

There is a vacancy for a

LOCAL SUPERINTENDENT

at

COALVILLE

a Sub-district within the
North-West Leicestershire District
The Superintendent is responsible
for the Sales & Service function,
distribution being the concern of another officer.
A modern house can be made available
under the terms of a
Service Occupation Agreement.
Salary within range £830-£1,015
with prospects of £1,095
for the man who can show results
Apply to:—

Divisional General Manager
Market Street,
Leicester.
within 10 days of this advertisement

WALES GAS BOARD
ABERDARE VALLEY UNDERTAKING

ASSISTANT ENGINEER & MANAGER

APPLICATIONS are invited for the above appointment.

Applicants should have appropriate Gas Engineering (Supply) qualifications with experience in Medium/Low pressure gas distribution, mainlaying, planning and utilization.

Some experience in administration would be an advantage but is not essential because every encouragement will be given to the successful applicant, to enable him to obtain a wide experience of management in an expanding Undertaking.

The post is pensionable, subject to a satisfactory medical examination.

The salary payable will be within Grade APT.6 (£895/£1,015 p.a.) commencing at a figure commensurate with qualifications and experience.

Applications, stating age, experience and giving full particulars of training and qualifications, together with the names of two referees, should reach the undersigned within 14 days of the appearance of this advertisement.

D. T. PHILLIPS,
Engineer and Manager.

Gas Offices,
Aberaman,
Nr. Aberdare.

WALES GAS BOARD

DEPUTY MANAGER
RHYMNEY AND ABER UNDERTAKING

APPLICATIONS are invited for the above position which will include the duties of Distribution Engineer.

Applicants should have appropriate Gas Engineering (Supply) qualifications and a wide experience in High/Low pressure gas distribution, mainlaying, planning and utilisation. Experience in administration, sales development and knowledge of domestic space heating would be an advantage.

The successful applicant will also be responsible for control of Gasholder Stations within the undertaking.

The position is pensionable and will be subject to a satisfactory Medical examination.

The salary payable will be within Grade A.P.T. 12, Provincial 'A' (£1,115-£1,260) commencing at a figure commensurate with qualifications and experience.

A house will be made available at a reasonable rent.

Applications, stating age and experience, and giving full particulars of training and qualifications, together with the names of two referees, should be received by the undersigned within 14 days of the appearance of this advertisement

D. I. ROWLANDS,
General Manager.

Gas Offices,
St. Martin's Road,
Caerphilly.

WALES GAS BOARD
CARDIFF UNDERTAKING

APPOINTMENT OF SHIFT ENGINEERS

DUE to rapid expansion of the Grangetown Gasworks at Cardiff, Shift Engineers are required.

The Station handles a base load of 12 mill. cu. ft. per day of crude coke oven gas, and has Gastechnik, Liquid and Ordinary Box Purification plants. The Station also has 12 mill. cu.ft. per day peak load plant capacity, consisting of C.W.G. and Butane/Propane plant.

The successful applicants will be expected to supervise the operation of the above plants and should have had experience in the control of labour.

The salary for these appointments, which are pensionable and subject to a medical examination, will be within the range of A.P.T. 10 Provincial 'A' of the National Salary Scales (£975-£1,095 p.a.) with initial placing according to experience.

There will possibly be assistance in the matter of housing.

Applications stating age, qualifications and experience, together with the names of two referees, must be received by the Undersigned within two weeks of the appearance of this advertisement.

J. POWDRILL,
General Manager and Engineer.

Gas Offices,
Bute Terrace,
Cardiff.

SOUTH WESTERN GAS BOARD
GAS WORKS . HEMPSTED . GLOUCESTER

CHEMIST

A CHEMIST is required who has had works experience and should possess H.N.C. in chemistry. The works has a number of interesting cast making and purification plants. Commencing salary will be within the range of A.P.T. 7/8 £770/£930 according to experience and qualifications. The post is pensionable. Application should reach the Works Engineer and Manager, South Western Gas Board, Hempsted Works, Gloucester, giving full details not later than Monday, August 28.

SALES REPRESENTATIVES required in Midlands, North East and Southern areas for town and L.P. gas fired space heating and industrial processing equipment. Good knowledge gas heating appliances and good contacts Gas Boards. Write with full details of experience to the Manager, Infra-Red Division, Getz Bros. & Co. 52, Jermyn Street, London, S.W.1.